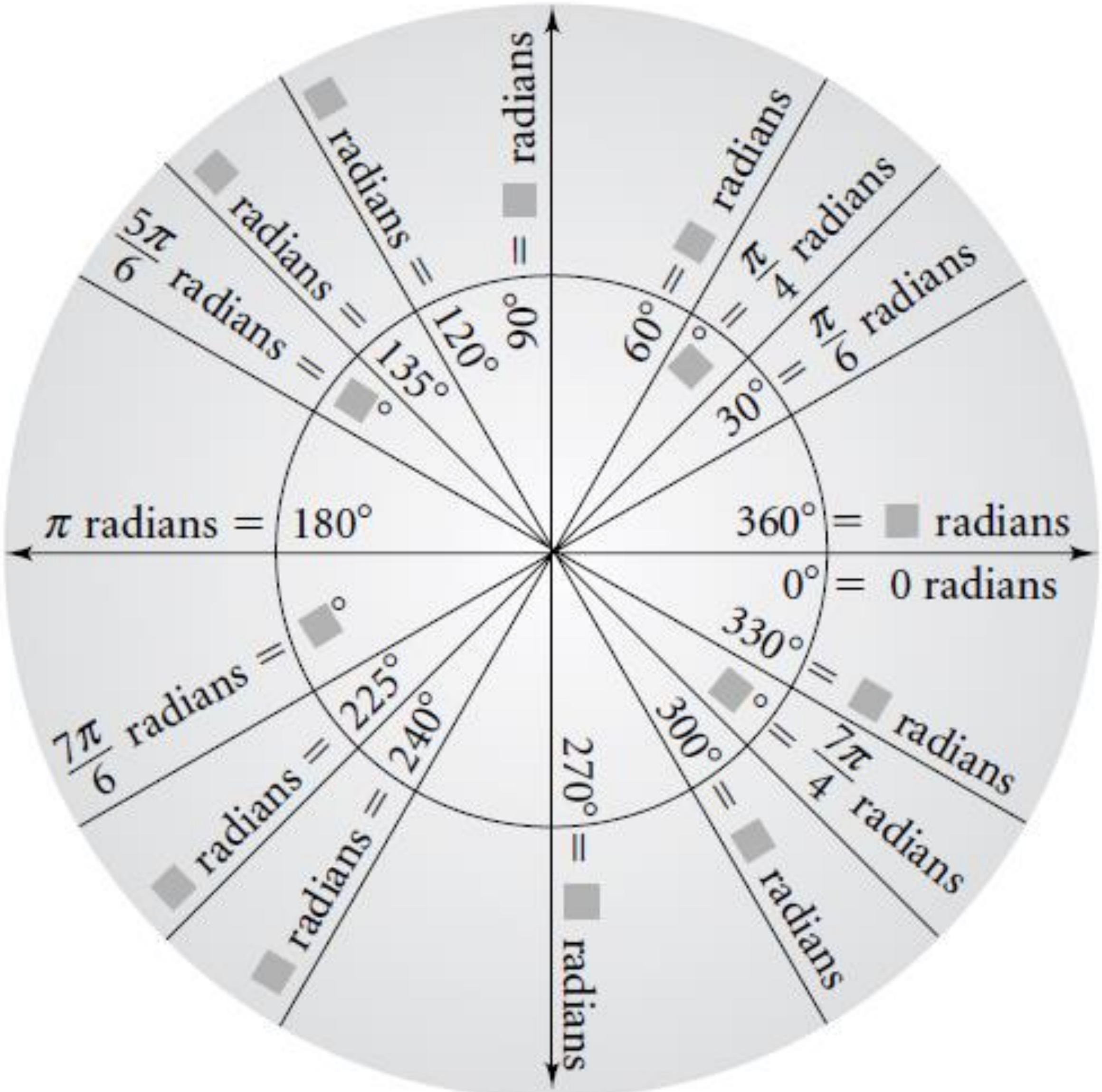
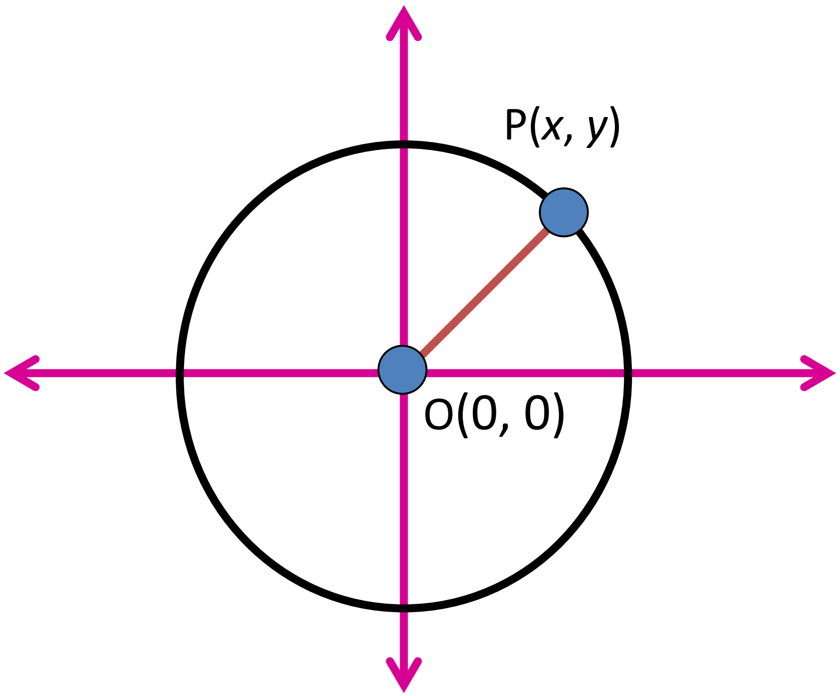
Benchmark Angles and Special Angles



4.2 The Unit Circle

Deriving the Equation of a Circle



Note: OP is the radius of the circle.

$$\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} = d_{OP}$$

The equation of a circle with its centre at the origin (0, 0) Is .

Determine the equation of a circle with centre at the origin and a radius of

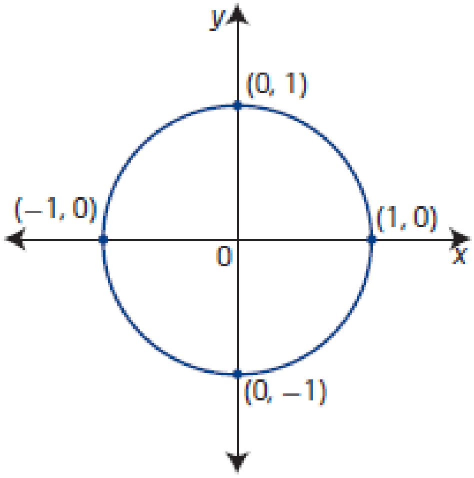
a) 2 units

$$x^2 + y^2 = r^2$$

b) 5 units

$$x^2 + y^2 = 5^2$$

c) 1 unit

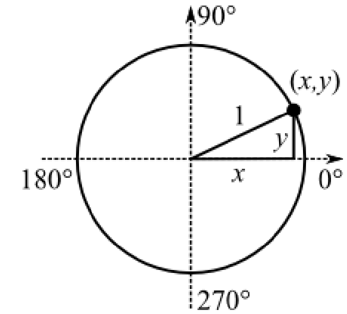


A circle of radius 1 unit with centre at the origin is defined to be a __________.

When r = ___, __________becomes _________.

The central angle and its subtended arc on the unit circle have the ________________________.

Coordinates on the unit circle P(x, y) satisfy the equation $x^2 + y^2 = 1$



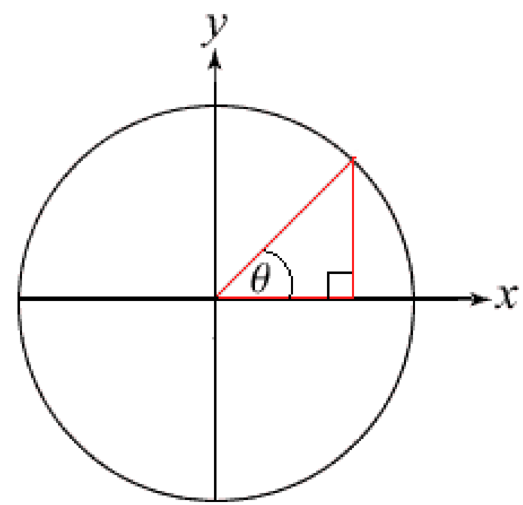
A point P(x, y) exists where the terminal arm intersects the unit circle.

Point P(x,y) McGraw Hill Teacher Resource DVD 4.2_193_IA

Determine the coordinates for all points on the unit circle that satisfy the conditions given. Draw a diagram in each case.

a) $P\left(\frac{1}{2}, y\right)$

$$x^2 + y^2 = 1$$

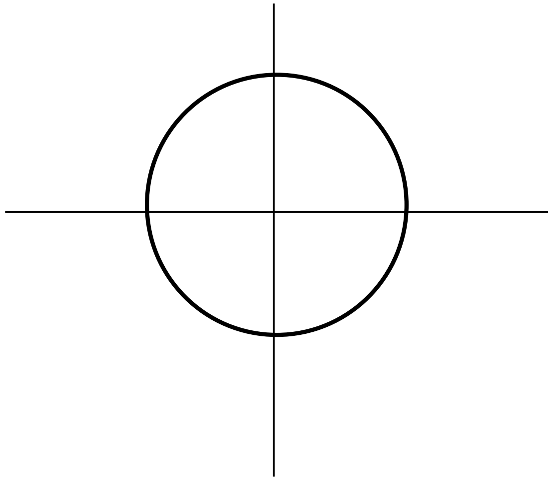


Why are there two answers?

Determine the coordinates for all points on the unit circle that satisfy the conditions given. Draw a diagram in each case.

b) $P\left(x, -\frac{2}{5}\right)$

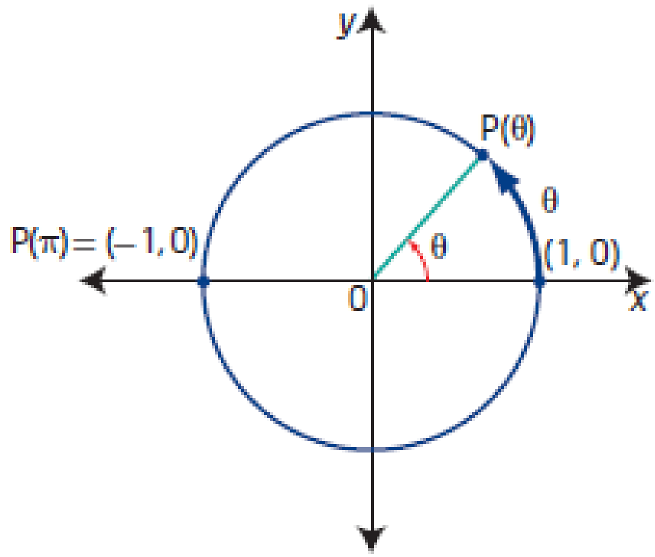
$x^2 + y^2 = 1$



c) The point $P\left(-\frac{\sqrt{3}}{2}, -\frac{1}{2}\right)$ **is the point of intersection of a terminal arm and the unit circle. What is the length of the radius of the circle?**

Relating Arc Length and Angle Measure in Radians

The function P(θ) = (x, y) can be used to relate the arc length, θ, of a central angle, in radians, in the unit circle to the coordinates, (x, y) of the point of intersection of the terminal arm and the unit circle.



When θ = π, the point of intersection is (-1, 0) , This can be written as

Determine the coordinates of the point of intersection of the terminal arm and the unit circle for each:

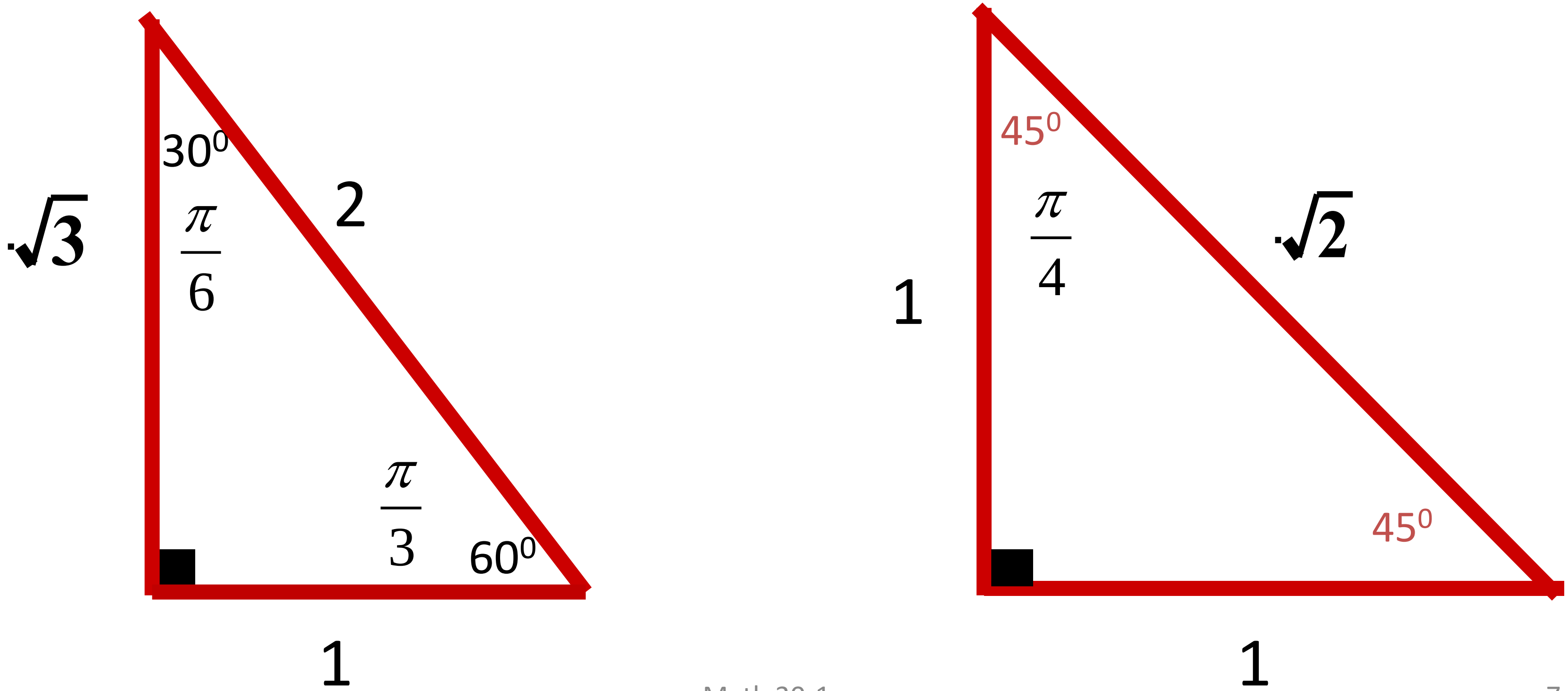
$$P(0) =$$

$$P\left(\sqrt{\frac{3\pi}{2}}\right) =$$

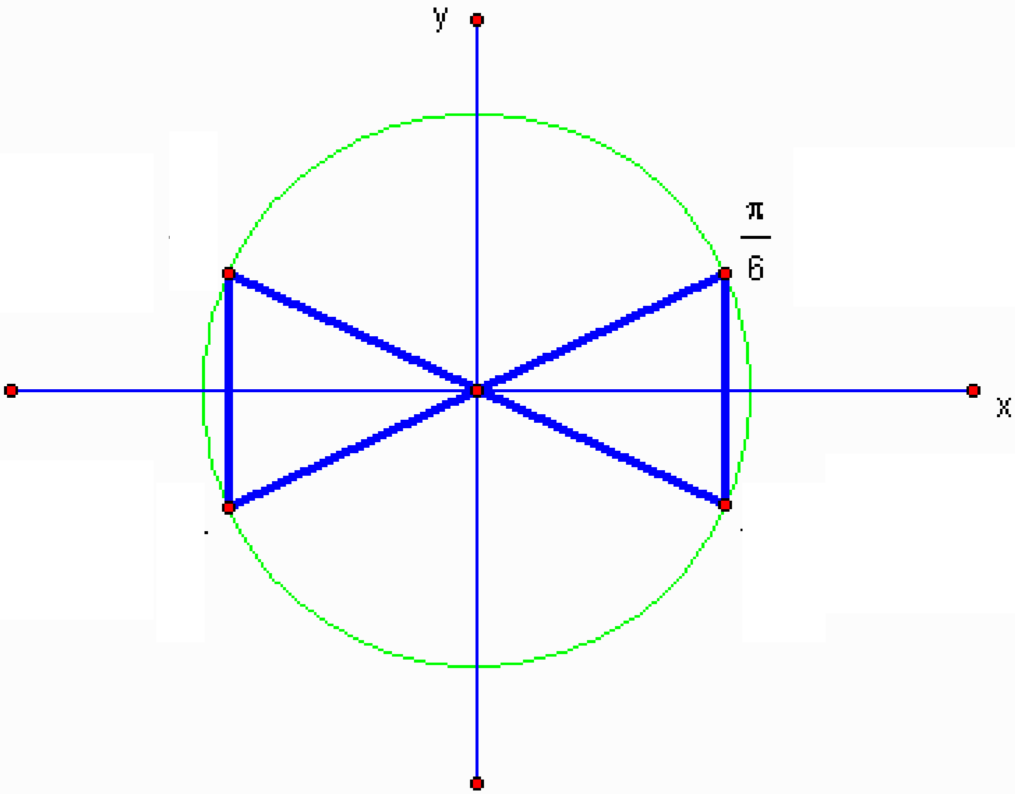
$$P\left(\frac{\pi}{6}\right) =$$

Unit Circle with Right Triangle Present

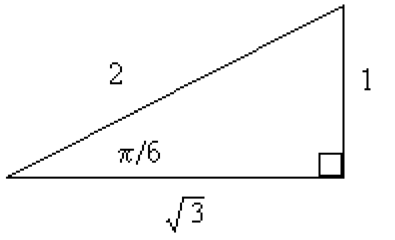
Special Triangles from Math 20-1



Exploring Patterns for $P\left(\frac{\pi}{6}\right)$

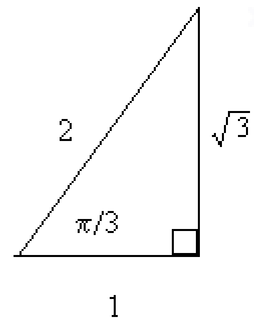


Reflect $\frac{\pi}{6}$ in the y-axis and in the x-axis



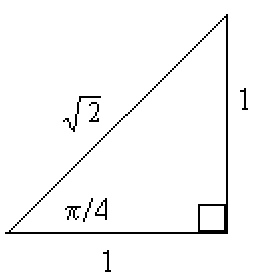
Convert to a Radius of 1

Exploring Patterns for $P\left(\frac{\pi}{3}\right)$



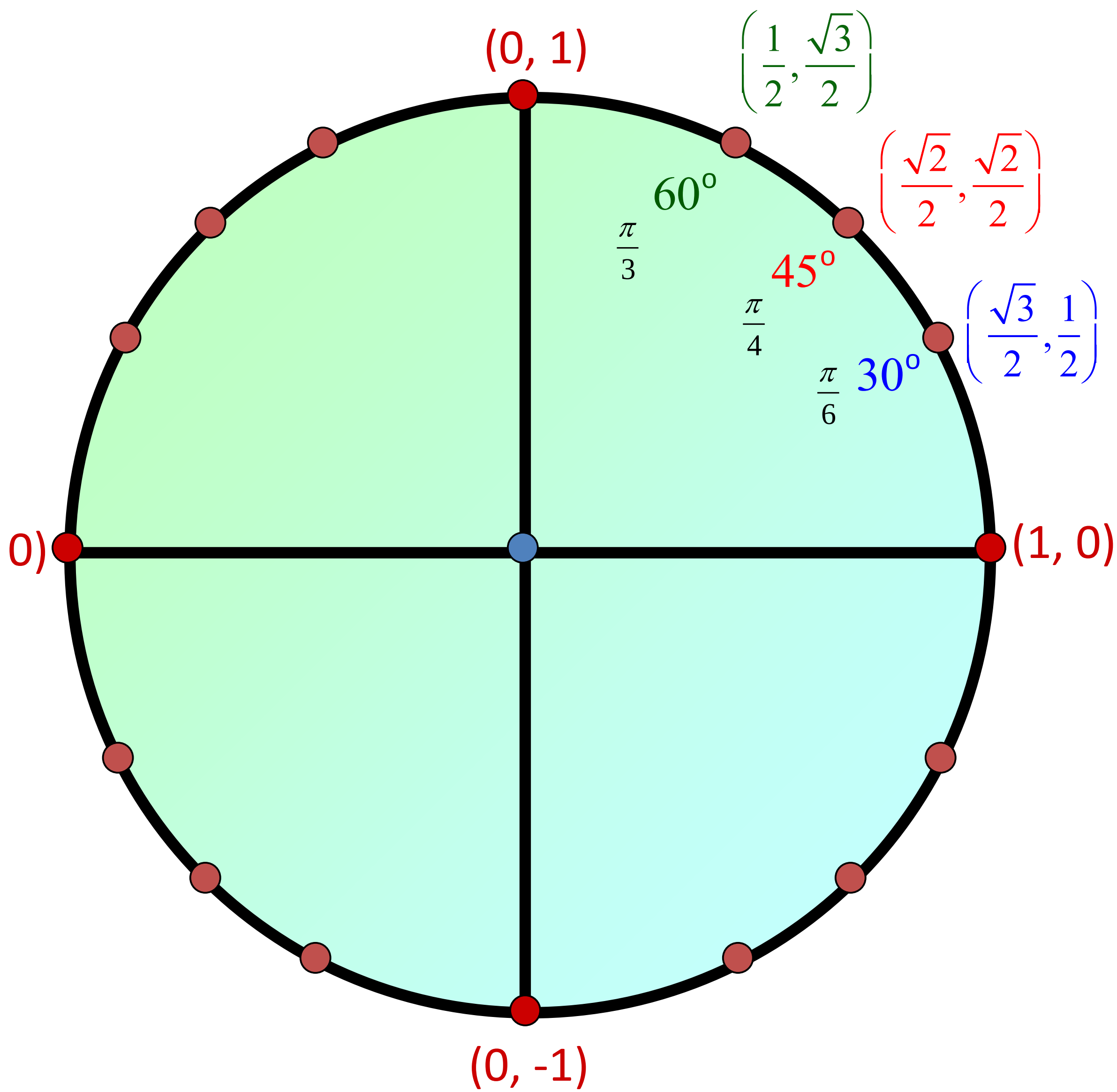
Convert to a Radius of 1

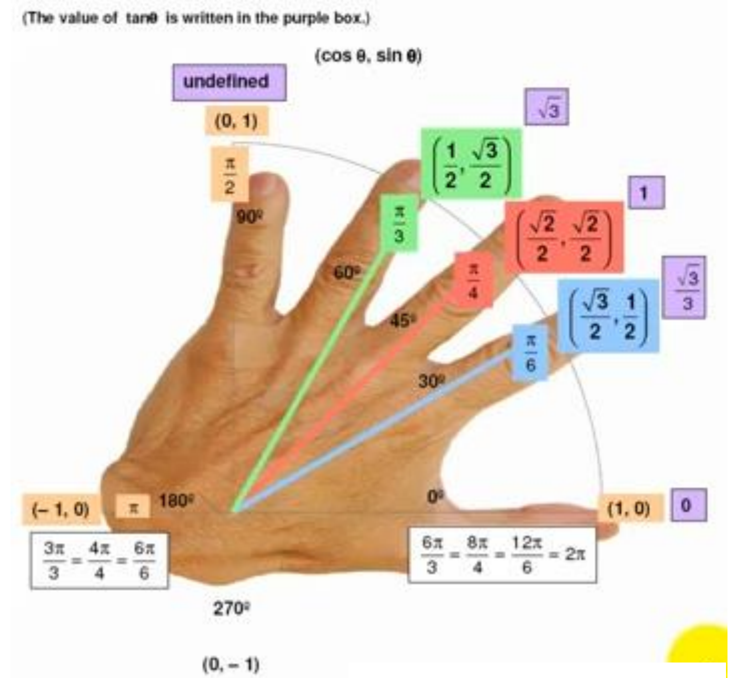
Exploring Patterns for $P\left(\frac{\pi}{3}\right)$



Convert to a Radius of 1

The Unit Circle





http://www.youtube.com/watch?v=YYMWEb-Q8p8&feature=youtu.be&hd=1

http://www.youtube.com/watch?v=AXxEv0P4IOI&feature=rellist&playnext=1&list=PLOQDHQLNRNBWM
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The Unit Circle